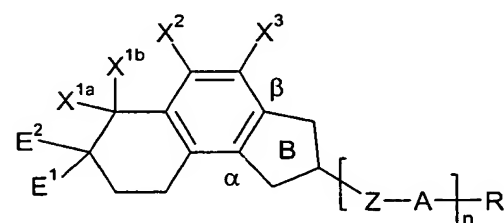
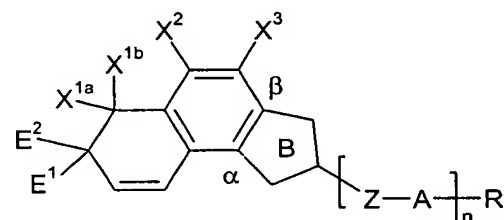
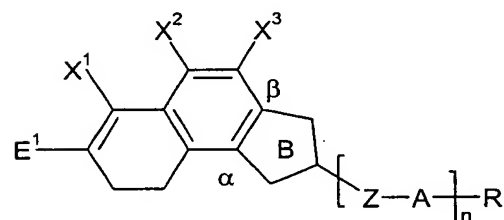
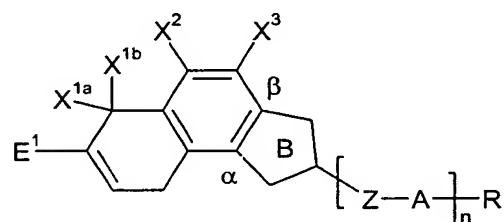
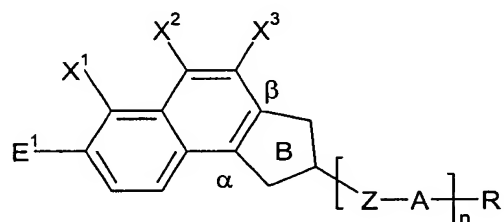


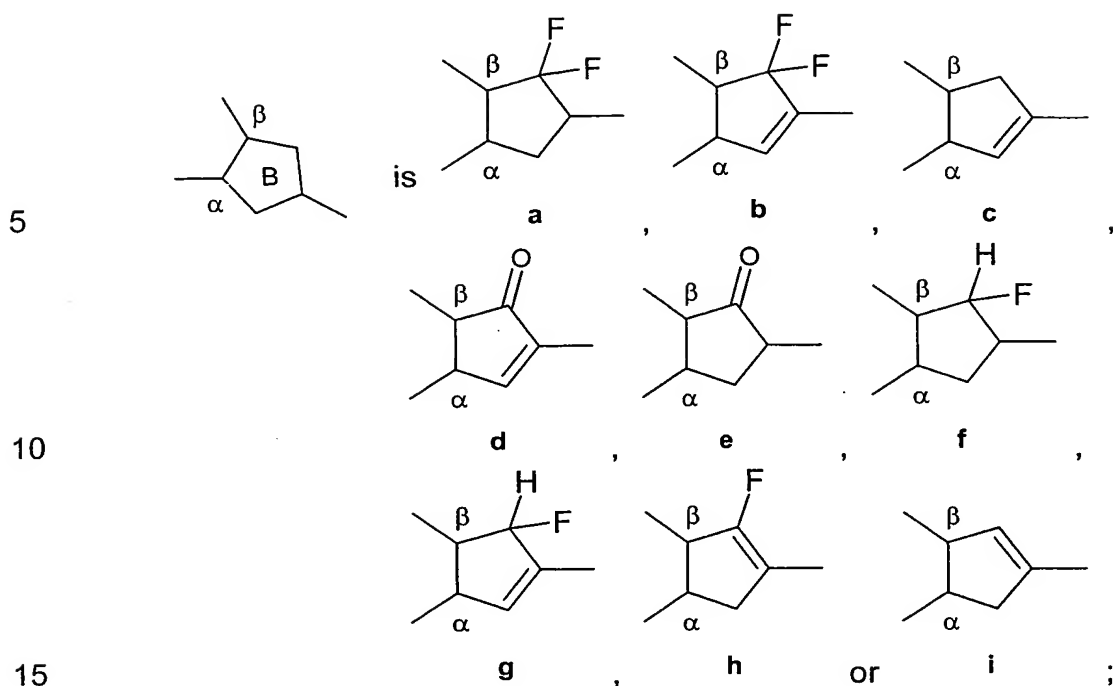
Patent Claims

1. Cyclopenta[a]naphthalene derivative of the general formula I, II, III, IV or V



in which:

- 133 -



A is in each case, independently of one another, 1,4-phenylene, in which =CH- may be replaced once or twice by =N-, and which may be monosubstituted to tetrasubstituted, independently of one another, by halogen (-F, -Cl, -Br, -I), -CN, -CH₃, -CH₂F, -CHF₂, -CF₃, -OCH₃, -OCH₂F, -OCHF₂ or -OCF₃, 1,4-cyclohexylene, 1,4-cyclohexenylenes or 1,4-cyclohexadienylenes, in which -CH₂- may in each case be replaced once or twice, independently of one another, by -O- or -S- in such a way that heteroatoms are not linked directly, and which all may be monosubstituted or polysubstituted by halogen;

Z is in each case, independently of one another, a single bond, a double bond, -CF₂O-, -OCF₂-, -CH₂CH₂-, -CF₂CF₂-, -CF₂-CH₂-, -CH₂-CF₂-, -CHF-CHF-, -C(O)O-, -OC(O)-, -CH₂O-, -OCH₂-, -CF=CH-, -CH=CF-, -CF=CF-, -CH=CH- or -C≡C-;

R is hydrogen, an alkyl, alkoxy, alkenyl or alkynyl radical having from 1 to 15 or 2 to 15 carbon atoms respectively which is unsubstituted, monosubstituted by -CN or -CF₃ or at least monosubstituted by halogen, where, in addition,
 5 one or more CH₂ groups in these radicals may each, independently of one another, be replaced by -O-, -S-, -CO-, -COO-, -OCO- or -OCO-O- in such a way that heteroatoms are not linked directly, halogen, -CN, -SCN, -NCS, -SF₅, -CF₃, -OCF₃, -OCHF₂ or -OCH₂F;

10 X¹, X^{1a}, X^{1b}, X² and X³ are each, independently of one another, hydrogen, an alkyl, alkoxy, alkenyl or alkynyl radical having from 1 to 15 or 2 to 15 carbon atoms respectively which is unsubstituted or at least monosubstituted by halogen,
 15 where, in addition, one or more CH₂ groups in these radicals may each, independently of one another, be replaced by -O-, -S-, -CO-, -COO-, -OCO- or -OCO-O- in such a way that heteroatoms are not linked directly, halogen, -CN, -SF₅, -SCN, -NCS, -CF₃, -OCF₃, -OCHF₂ or
 20 -OCH₂F;

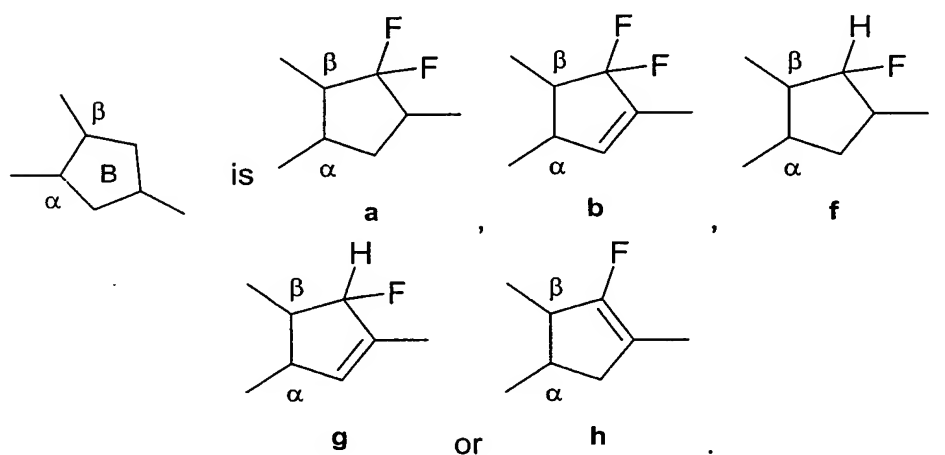
E¹ and E² are each, independently of one another, hydrogen, an alkyl, alkoxy, alkenyl or alkynyl radical having from 1 to 15 or 2 to 15 carbon atoms respectively which is unsubstituted, monosubstituted by -CN or -CF₃ or at least monosubstituted by halogen, where, in addition, one or more
 25 CH₂ groups in these radicals may each, independently of one another, be replaced by -O-, -S-, -CO-, -COO-, -OCO- or -OCO-O- in such a way that heteroatoms are not linked directly, halogen, -CN, -SCN, -NCS, -SF₅, -CF₃, -OCF₃, -OCHF₂, -OCH₂F or -(Z-A)_n-R; and

n is 0, 1, 2 or 3;

35 where

in the formula I, ring B does not stand for the formula **c** if X^1 , X^2 and X^3 are simultaneously hydrogen, and
 in the formula I, ring B does not stand for the formula **e** if X^2 and X^3 are simultaneously fluorine or if E^1 is hydrogen and simultaneously X^1 and X^2 are fluorine.

2. Cyclopenta[a]naphthalene derivative according to Claim 1, characterised in that

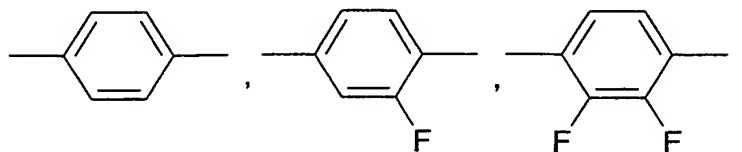


3. Cyclopenta[a]naphthalene derivative according to Claim 1 or 2, characterised in that

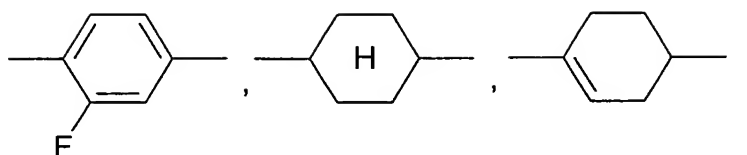
Z is a single bond, $-\text{CF}_2\text{O}-$, $-\text{OCF}_2-$, $-\text{CF}_2\text{CF}_2-$, $-\text{CH}=\text{CH}-$, $-\text{CF}=\text{CH}-$, $-\text{CH}=\text{CF}-$ or $-\text{CF}=\text{CF}-$.

4. Cyclopenta[a]naphthalene derivative according to at least one of the preceding claims, characterised in that

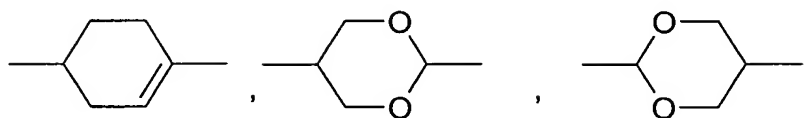
A is



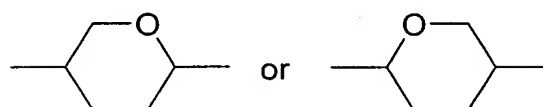
- 136 -



5



10



5. Cyclopenta[a]naphthalene derivative according to at least one of the preceding claims, characterised in that

15

R is an alkyl radical, alkoxy radical or alkenyl radical having from 1 to 7 or 2 to 7 carbon atoms respectively.

6. Cyclopenta[a]naphthalene derivative according to at least one of the preceding claims, characterised in that

20

E^1 and E^2 , independently of one another, are hydrogen, an alkyl radical or alkoxy radical having from 1 to 7 carbon atoms, fluorine, chlorine or $(-Z-A)_n-R$, in which n is 1, Z is a single bond, A is 1,4-cyclohexylene or optionally mono- or poly-fluorine-substituted 1,4-phenylene, and R is alkyl, alkoxy or alkenyl having from 1 to 7 or 2 to 7 carbon atoms respectively.

25

7. Cyclopenta[a]naphthalene derivative according to at least one of the preceding claims, characterised in that
- 30 at least one of X^1 , X^2 and X^3 or at least one of X^{1a} , X^{1b} , X^2 and X^3 is $-CF_3$, fluorine or chlorine.

35

8. Cyclopenta[a]naphthalene derivative according to at least one of the preceding claims, characterised in that X^1 , X^2 and X^3 or X^{1a} , X^{1b} , X^2 and X^3 are $-CF_3$, fluorine and/or chlorine.
- 5 9. Cyclopenta[a]naphthalene derivative according to at least one of the preceding claims, characterised in that X^1 , X^2 and X^3 or X^{1a} , X^{1b} , X^2 and X^3 are fluorine.
- 10 10. Use of a cyclopenta[a]naphthalene derivative according to at least one of the preceding claims in liquid-crystalline media.
11. Liquid-crystalline medium comprising at least two liquid-crystalline compounds, characterised in that it comprises at least one cyclopenta[a]naphthalene derivative according to at least one of Claims 1 to 9.
- 15 12. Electro-optical display element containing a liquid-crystalline medium according to Claim 11.

20

25

30

35